

## **Example information requirements** **for** **Flood Control Projects**

Minor flood control projects mitigate future flood damages by modifying the runoff characteristics in a specific project area. The projects can include a wide variety of activities including, but not limited to increasing the capacity of a storm sewer system, construction of a new detention facility, or alteration of an existing drainage facility. Although the specific design and relevant project data vary depending on the specifics of the mitigation activity proposed, the general type of information required in a complete grant application is similar. The following sections describe the information generally required and provides a sample for each section.

### **Project Description**

The proposed mitigation activity should be well defined, with a clear and detailed written description of the entire project. Technical documentation should be provided verifying that the proposed project successfully reduces future flood levels and associated future flood damages. In addition, the anticipated level of project effectiveness should be stated as clearly as possible. Technical back-up information should be included with the project description, including but not limited to the following:

- Describe in detail the project that is being proposed;
- Include any studies, schematics, or preliminary (or final if available) construction plans that will help give details of the proposed project (sealed by a Professional Engineer registered in the State of Alabama);
- Include a site map clearly showing the location of all proposed project components and their location relative to the areas of historic damage within the contributing watershed;
- Include any hydrologic and/or hydraulic calculations or models that support the proposed mitigation by clearly demonstrating the decrease in future flood levels and associated future flood damage;
- Show that any NFIP requirements have been addressed (i.e. fill in the special flood hazard area (SFHA));
- Describe and quantify any potential downstream effects (if any) from the proposed project; and,

### **Example Project Description**

The proposed project includes the replacement of an undersized 60-inch corrugated metal pipe (CMP) under Main Street with a 70-foot long double 5-ft x 5-ft concrete box culvert with erosion control protection placed at both the inlet and the outlet of the culvert. ABC Engineers, Inc. has prepared a preliminary design report (sealed by a Professional Engineer) that includes the hydrologic (USACE HEC-1 model) and hydraulic (Culvert Master) back-up calculations used to size the new structure. The report includes existing and proposed water-surface elevations upstream of the culvert for various storm recurrence intervals. The analyses show that the existing culvert has a capacity equal to a 5-year storm. The new culvert was designed to pass a 50-year storm frequency discharge with a headwater elevation of 108.25, allowing 18-inches of freeboard below the road shoulder (109.8). This design is based on the road culvert standards required per the 2002 County Public Facilities Manual (applicable sections are attached to the application). Once construction is complete, the frequent storm events will no longer make Main Street impassable.

The new box culvert will be constructed parallel to the existing CMP, and the existing culvert will be removed once the new box culvert is constructed. All state erosion and sediment control procedures will be followed during construction. A schematic of the proposed culvert is included in the engineers report. Because the Main Street crossing of Swift Creek is in a SFHA, all NFIP requirements will be met. As shown on the attached watershed drainage map, Swift Creek flows through undeveloped county property into the Big River approximately 500 feet downstream of

the road crossing; so downstream effects from the new box culvert are expected to be inconsequential. Due to the local terrain, Main Street is not impacted by flood events along the Big River.

### **History of Hazards**

A written description of the history of flooding that has occurred at the project location should be provided and should include the following information:

- Describe the source of flooding (e.g. riverine, coastal, local drainage, etc.) and provide any explanation of the cause of flooding. (e.g. pre-FIRM construction, increased upstream development, inadequate drainage capacity of flooding source, etc.);
- List the history of previous flood events including dates, extent and magnitude of impacts, photos of historic flooding, overall cost of damages, and the frequency of each specific event and the source of storm frequency data;
- If the facility is in a FEMA SFHA, list the corresponding flood depths and discharges from the Flood Insurance Study (FIS) for the various storm recurrence intervals;

### **Example History of Hazards**

There have been repetitive flood damages to and closure of Main Street due to the undersized 60-inch diameter CMP culvert along Swift Creek. As a result of the increase in development in the upstream watershed over the years, the culvert no longer has the capacity to pass the flow during large storm events causing Swift Creek to overtop Main Street, closing the road to traffic. Main Street is a high-traffic-volume road in the community and is one of the main access routes to the Hospital. If Main Street is impassable, the response time of emergency vehicles to the southern portion of the community is greatly increased. A city street map is attached with the application highlighting the location of the culvert. Also attached are photos of road flooding that occurred during the June 17, 2002 storm. That storm was determined to be a 10-year event.

Post-flood maintenance and repair costs, including repavement of the road surface, regrading of the eroded gravel shoulders and road embankment, cleanup of debris washed onto the road surface and within the channel upstream of the culvert and repairs to the CMP culvert have cost the community over \$215,000 in the past 20 years. Force-account material and labor records for repairs after 15 different flood events are summarized in a table included with the application.

The proposed project is to replace the undersized 60-inch CMP under Main Street with a double 5-ft x 5-ft concrete box culvert, which will allow the runoff from a 50-year storm event to pass through the culvert without overtopping the road. Swift Creek is included on the County FIRM panel 00135 as a special flood hazard area Zone AE. Selected portions of the 1987 FEMA Flood Insurance Study - including the FIRM panel, stream profile and Summary of Discharges table - are included with the application.

### **Description of Existing Conditions**

The existing conditions within the project area should be described in detail and should include the following:

- Describe existing flow conditions including stream characteristics, system/watershed inlet and outlet locations;
- Provide a description of all infrastructure including, but not limited to size, materials, conditions, dates of construction, etc.;
- Describe the watershed including current and proposed land use, topography of the area, and areas upstream or downstream that are impacted by the existing facility.

### **Example Description of Existing Conditions**

Main Street was originally constructed in 1965. When the road was widened in 1983, the length of the 60-inch CMP was increased from 45 to 75 feet. The construction drawings completed for the 1983 widening project are included with the application. The drawings show the as-built details of the culvert. The invert of the culvert was paved during the 1983 construction to increase the flow capacity. The design

calculations for the original or the extended culvert could not be located. The culvert and wing-walls have been inspected and maintained over the years. The construction joint between the original and extended culvert has held up fairly well, but frequent maintenance has been required to keep the connection from separating. Current photos of the construction joint, the culvert entrance and exit, the upstream and downstream channel and the general area have been labeled and included in the application.

The 110-acre watershed drainage to the culvert has become urbanized over the years, causing significant increases in runoff during storm events. The channel grade of Swift Creek varies from steep in the upper portions to moderate around the Main Street crossing. In response to the rapid growth in County development in the mid 1990s a watershed study was prepared by ABC Engineers, Inc. for the county in 1997. The study determined the existing and ultimate hydrologic conditions of selected watersheds and calculated water-surface elevations for various recurrence intervals for the major streams. The study showed that the existing conditions headwater elevation for the 5-year storm is 110.5, which is one-half foot overtop of the low point of the road (elevation 110). A copy of this report has been attached to this application.

As stated in the History of Hazards, flood-related damages to Main Street at the crossing of Swift Creek are becoming more frequent with the new upstream development. In addition, a townhouse development on the upstream side of the road experienced high water levels and basement flooding during the June 2002 storm.

### **Project Milestones**

Additional supporting documentation for the project should include a work schedule to:

- Describe in detail the anticipated project schedule;
- Include all phases of the task including survey, design/specifications, construction, permitting, site preparation, etc.;

### **Example of Project Milestones**

Calendar days from Award Task	Start	Complete	Total Days
Engineering Design	0	90	90
Design Plan Approval			
Permitting	90	120	30
Prepare Bid Documents and Advertise for Bids	90	150	30
Award Construction Contract	150	170	20
Construct Project	170	230	60
Project Closeout	230	260	20
Total to Complete Project			260

This schedule is based on the assumption that the project construction phase will fall within the normal construction season. Should this phase occur between the months of November and February, construction may be delayed accordingly.

### **Budget Estimate**

- Make sure all anticipated flood control project costs are detailed (materials, labor, equipment rental, professional services, permits, etc.). Avoid the use of "lump sum" items.
- Provide the source of the estimate (e.g. documented local cost, bids from qualified professionals, published national or local cost estimating guides, etc.)
- Consider the potential future date of construction when compiling the cost estimate.

**Example Budget Estimate**

A detailed cost estimate has been included in the Project Cost Summary Table attached. The source for the entire estimate is ABC Engineers, Inc. (the project designers). Based on the cost estimates provided, the total project cost for this project is \$220,320, with a federal share of \$165,240.

**NOTE:**

All sections of the HMGP application are important and must be addressed thoroughly. This document only covers those parts of the application that often are the most difficult to complete.